REMARKS

Reconsideration of the Office Action of March 4, 2003 is respectfully requested. Relative to the claim amendments made herein, no new matter is considered to have been introduced.

In the present application there is currently pending independent claims 15, 18, 30 and 31 with these independent claims having been subjected to prior art rejections as summarized in the below table. Reconsideration of the prior art rejections raised is respectfully requested.

IDENTIFICATION/ CLAIM NOS.		*STATUTORY GROUNDS*	*REFERENCE(S)*
A	*15*	*35 U.S.C. 102(b)*	Fukui
B	*15*	*35 U.S.C. 102(b)*	Taylor
C	*15*	*35 U.S.C. 102(b)*	Franz
D	*15*	*35 U.S.C. 103*	Kirby in view of Fukui
E	*15*	*35 U.S.C. 103*	Franz in view of Fukui
F	*15*	*35 U.S.C. 103*	Suski in view of Franz
G	*18*	*35 U.S.C. 102(b)*	Reinhold
H	*18*	*35 U.S.C. 102(b)*	Franz
I	*18*	*35 U.S.C. 103*	Fukui in view of Suski
J	*30*	*35 U.S.C. 102(b)*	Franz
K	*30*	*35 U.S.C. 103*	Fukui in view of Suski
L	*31*	*35 U.S.C. 102(b)*	Reinhold
M	*31*	*35 U.S.C. 103*	Fukui in view of Suski

IDENTIFICATION/ CLAIM NOS.		*STATUTORY GROUNDS*	*REFERENCE(S)*
N	*31*	*35 U.S.C. 103*	Suski in view of Franz

Considering first the prior art rejections ("A"-"F" above) raised against claim 15, it is respectfully submitted that claim 15 patentably distinguishes over each of the applied rejections.

Relative to rejection A, in the Office Action there is indicated that --

"Fukui et al. discloses the claimed invention at Fig. 43 with semiconductive stretch sensitive material 72' and electrodes 74' (see Fig. 42) with the cloth 81 having the bottom surface of the electrodes 74' in intimate contact therewith. That is, the structure of Fig. 81 can be view[ed] flipped over, so that cloth 81 is on the bottom. The electrode portion 74' is in intimate contact with fabric 81."

Fukui et al. provides cut away views of the various layers in Figures 39 and 42 (the latter being referenced above in the Office Action) and features, in top to bottom order, (before any flipping) relative to the right end (for ease of reference):

1) an upper electrode clamp plate,

2) an electroconductive resin,

3) an insulation break down film of stretch sensitive electro-conductive sheeting,

4) a stretch sensitive electroconductive fabric sheet and (relative to Figure 42 as Fig. 39 not labeled)

5) an electrically insulating elastomer sheet, and

6) the lower electrode clamp plate.

Figure 43 indicates its embodiment features " the whole product . . . stitched with stretchable cloths at both surfaces of the stretch sensitive electroconductive device". Thus, for purposes of discussion the non-flipped arrangement is as follows:

a) stretchable cloth layer,

1) an upper electrode clamp plate,

2) an electroconductive resin,

3) an insulation break down film of stretch sensitive electro-conductive sheeting,

4) a stretch sensitive electroconductive fabric sheet and (relative to Figure 42 as Fig. 39 not labeled)

5) an electrically insulating elastomer sheet,

6) the lower electrode clamp plate, and

b) stretchable cloth layer.

Flipping the above order gives —

b) stretchable cloth layer,

6) the lower electrode clamp plate,

5) an electrically insulating elastomer sheet,

4) a stretch sensitive electroconductive fabric sheet and (relative to Figure 42 as Fig. 39 not labeled),

3) an insulation break down film of stretch sensitive electro-conductive sheeting,

2) an electroconductive resin,

1) an upper electrode clamp plate, and

a) stretchable cloth layer.

In Fukui at al. the invention relied upon in the rejection is directed at a stretch sensitive device and thus utilizes an electrode arrangement that is associated with such a stretch device. This involves an end clamp type electrode between which elements 2-5 above are sandwiched. The embodiment in Figure 43 is asserted in the Office Action as showing a cloth layer 81 which, when the device is flipped over, is in contact with the lower surface of an electrode.

Claim 15 of the present invention, however, describes a flexible support made of an insulating fabric with two electrodes applied on said insulating fabric with each electrode structure having a lower surface *and an opposing upper surface*, with the lower surface being in contact with said insulating fabric. Claim 15 further features a layer of semiconducting material *applied **on top*** of the electrode structures. In the context of the present claim 15 "on top of the electrode structure", while perhaps being a relative term from the standpoint of flipping between top and bottom, does not include an arrangement where the required layer is clamped internally between the upper surface and the lower surface of an electrode and thus can not be said to be applied "on top" of an electrode structure. This deficiency is not considered to have been addressed in the prior Office Actions.

Thus, taking the fabric layer 81 in Figure 43 in a flipped over state as set forth in the Office Action places the fabric adjacent the lower surface of the electrode. However, since the electrodes use a sandwiching arrangement the referenced "semiconductive stretch sensitive material 72'" is sandwiched in the intermediate area of the electrodes and thus is not applied on top of the electrodes. This deficiency in Fukui et al results in the reference not disclosing all claimed features of the present invention and thus incapable of "anticipating" the claimed invention. Also, in view of stretch emphasis in Fukui et al and the use of the electrodes as means for clamping (note the rivot like other electrode embodiments which also provide for the pinch or

clamping of the ends of the material to be placed in tension), the Fukui et al. reference also fails to disclose or suggest in any fashion the claimed arrangement of claim 15.

Moreover, because of the clamping or pinching arrangement involved with the electrodes in Fukui et al., the same deficiency is present whether fabric layers are placed on opposite sides of the "product" in Fukui et al. and regardless of whether flipped or not as the sandwiched "semiconductive stretch sensitive material 72" is never applied on top of the electrode structures having a lower surface in fabric contact.

See also new dependent claim 42 which even further distinguishes the claimed invention over Fukui et al.

As to rejection B (Taylor) set forth in the table above, this reference was addressed during the International Preliminary Stage and Applicants note that it relates to a pressure sensor of a completely different type than the pressure sensor of the claimed present invention. The sensors described in Taylor are of the so called "through mode", wherein the relevant electrode structures are arranged on two different substrates with a pressure sensing material being sandwiched **between the electrode structures**. In this regard, Applicants note the description of the sock construction set forth in lines 2-15 which describe the stacked tubular layers for this "through mode" device.

The Taylor sensor thus comprises a first electrode structure, which is arranged on a first substrate, and a pressure sensitive element (piezoresistive element), which is arranged on top of the first electrode structure and in electrical contact with the first electrode structure. A second electrode structure arranged on a second substrate is arranged on top of the pressure sensitive element so as to be in electrical contact with said piezoresisitive element. Taylor thus does not

disclose pressure sensitive material being applied to the top of the electrode structures or the electrodes forming an active zone being arranged on a single substrate.

As to rejection C above, in the Office Action reliance is placed on the polyester flexible support 14 of Franz with the polyester asserted as being " *a 'fabric' where there is no definition of what is encompassed by the term (see Kurumatani et al. for a similar type of plastic fabric)*". The assertion that the plastic polyester film substrates 12 and 14 of Franz is respectfully traversed as it fails to disclose an insulating fabric and the reliance on the fiber based pre-preg material of Kurumatani et al is further respectfully submitted to be misplaced since Kurumatani involves a fiber based non-woven material while Franz merely discloses a plastic film and there would be no reason to alter Franz material to a high strength fiber based pre-preg material as there is present an underlying support in Franz (col. 5 lines 30 to 40). It is further noted that a definition of fabric is presented on page 6, lines 12 + in the specification of the present application which is consistent with the dictionary definition "a cloth made by weaving, knitting or felting fibers" with "felting" being considered to encompass a non-woven fiber based material – in conformance with "non-woven" currently used today to include natural and man-made fibers that are accumulated or felted into a fabric. In the Office Action, there has not been presented any evidence that one of ordinary skill in the art would interpret the plastic layer in Franz as being a fabric, and thus it is respectfully submitted that an anticipation rejection has not been established and a prima facie case of obviousness has also not been established.

In reference to rejections D and E above wherein reliance in placed on Franz or Kirby as further modified by Fukuia in each instance, like Franz above, Kirby also fails to disclose the use of fabric in conjunction with its strain gauge assembly -- noting the discussion of metal

fabrication achieving a smooth surface for allowing strain gauge operation and that the diaphragm discussion merely references an organic plastic layer.

In Franz the polyester film is supported by the underlying (e.g., laptop) frame structure with the keys positioned above the polyester film. There is lacking any disclosure or suggestion in Franz of using a fabric material in the context of the environment for which its transducer array is designed for such as a laptop keyboard. Nor does the disclosure of Fukui et al. support the asserted modification in the Office Action rejection. That is, in Fukui et al. there is an emphasis on providing a stretch factor with its stretching fabric. Franz is not designed for a stretch environment and there is lacking any disclosure in the applied references suggesting that a stretchable fabric in the environment set forth in Franz would be in any way desirable. Kirby's strain gauge involves a bending sensing. Thus one of ordinary skill in the art would not look to a stretching fabric material and, not surprisingly, there is lacking any disclosure or suggestion for use of a fabric in the context of the base references in Kirby as in the case of Franz. A reference to use in a diaphragm such as the organic plastic layer diaphragm noted in Kirby is respectfully submitted not to in any way bridge or remedy this basic deficiency in each of the applied combinations in D and E above.

In the obviousness assertion in rejection F above there is an assertion that it would have been obvious, based on Fukui et al., to convert the simple conductive ink spray pattern directly sprayed on the plastic wire ribbon substrate in the environment disclosed in Suski (a potentiometer sensing system monitoring bending of the printed circuit) with an arrangement where the simple circuit is replaced by an electrode structure that is covered with a semi-conducting layer – with no rationale given for increasing the complexity in the environment set forth in Suski. It is respectfully submitted that one of ordinary skill in the art would not have

made such an asserted revision and that there is lacking any disclosure or suggestion in the applied reference which would have motivated one of ordinary skill in the art to make the modifications set out in rejection F.

Based on the foregoing, it is respectfully submitted that claim 15 is not anticipated or rendered obvious under the asserted rejections A to F above.

Considering the rejections raised against claim 18 above (rejections G, H and I), rejection G includes an assertion, with reference to the Preliminary Examination Report, that Reinhold et al. (DE '702) is considered disclose at Fig. 4a the features of claim 18. It is respectfully submitted that the DE '702 does not anticipate claim 18 of the present application. The DE '702 reference relates to a passenger detector comprising two electrode structures and a layer of semi-conducting material. The electrode structures are arranged on a first substrate while the semi-conducting material is arranged on a second substrate (see the abstract "two laminated poymer layers **respectively** incorporating a semiconducting material and two conductor paths"). The two substrates are laminated together so that the layer of semi-conducting material faces the two electrode structures of the first substrate. In other words, the pressure dependent electrical resistance of the pressure sensors of Reinhold et al is based on a surface effect while the pressure dependency of the present invention is based on a volume effect inside of the semi-conducting material.

The DE '702 sensors are commonly known as Force Sensing Resistors (FSR). In this type of sensors, the layer of semi-conducting material is not continuously in intimate contact with the electrodes. That is, in an FSR type pressure sensor, if no force acts on the pressure sensor, the semi-conducting layer is generally designed not to be in contact with the electrodes as the first and second supporting layers are spaced by means of a spacer. Applicants note that on

occasion, depending on manufacturing tolerances, it may be the case that some of the protrusions of the semi-conducting layer surface might be in contact with the electrodes. However the electrical contact resulting from this mechanical contact has a very high resistivity, and in any case, the semi-conducting layer is not in intimate contact with the electrode structure.

If a force acts on the FSR pressure sensor, the semi-conducting material is pressed against the electrodes and the number of protrusions being in mechanical contact with the electrodes increases with the force applied. This increase of the contact points and the resulting increase of the contact surface between the separately supported semi-conducting layer and the electrodes reduces the resistance at the boundary layer between the semi-conducting material and the electrodes. The reduced resistance is depending on the force acting on the sensor.

The semi-conducting material of DE '702 comprises micro-protrusions on its surface facing the electrodes. If a pressure is applied to the sensor, the semi-conducting material is pressed onto the electrodes, whereby the micro-protrusions are responsible for a force dependent increase of the contact surface between the electrodes and the semi-conducing material. Thus the electrical resistance between the semi-conducting material and the respective electrode and accordingly the electrical resistance between the two electrodes decreases with the applied force.

A review of the present claim 18 reveals that there is included that the semiconducting material is in "continuous intimate contact" with the electrode structures within the active zones, which, within the context of claim 18, establishes an intimate electrical contact relationship between the electrode structures and semiconducting layer application thereon in the active zones which is different than the "non-continuous contact" arrangement associated with the above described FSR device.

As to the rejection based on Franz (H), this reference discloses polyester film 14 with conducting contacts 22 and 24 with a resistive layer 18 (described in column 5, lines 5-8 as being " referred to herein as a conducting element or substantially planar layer and is preferably formed from carbon ink screen printed onto surface 16") in electrical contact with conducting contacts 22, 24 which have respective terminal pads 26 and 28. A plurality of shunt elements of higher conductivity than resistive layer 18 are formed on a separate substrate and positioned above resistive layer 18. In operation, changes in resistivity due to current variations in the electrical field across the resistive layer 18 are monitored with the changes in resistivity being caused by the number of contact points integrated by activated shunts against the resistive layer. Accordingly it is the resistance variations that develop based on the relationship between the higher conductive shunts and the less conductive resistive layer which is unlike the claim 18 invention featuring a semiconducting material having an internal resistance which varies with a deformation of the layer. Accordingly, Franz fails to disclose or suggest the claim 18 invention.

The rejection (I) raised against claim 18 above based on Fukui et al. and Suski is also respectfully traversed. In the rejection it is acknowledged that Fukui fails to disclose the active zone arrangement of claim 18 and reliance is placed on Suski in an effort to remedy this deficiency. However, as explained above, Fukui fails to disclose an arrangement where the semi-conducting material is applied, within the active zones, on the upper surfaces of the electrodes (this being regardless of whether flipped over or not due to the sandwiching or clamping arrangement of Fukui's electrode structures which places the semiconducting stretch material internally within the clamping components and not on the upper surfaces of those electrodes). In addition, because Fukui focuses on stretching material between clamp-like

electrodes, there are different criteria involved and the secondary reference to Suski which is not in a stretch environment fails to provide the motivation relative to the arrangement in Fukui.

The rejection of claim 30 in J above based on Franz is respectfully submitted to be deficient based on the comments above concerning the application of Franz in claims 15 and 18 (rejections C and H above).

The rejection of claim 30 under K above is respectfully submitted not to present a prima facie case of obviousness based on the discussion in rejection H above.

The rejection of claim 31 under L above is respectfully submitted to be deficient based on the comments raised in the discussion of rejection G above concerning DE '702.

The rejection of claim 31 under M above based on Fukui et al and Suski is respectfully submitted not to present a prima facie case of obviousness based on the discussion in rejection (I) above.

The rejection of claim 31 under N above based on Suski in view of Franz is respectfully submitted not to present a prima facie case of obviousness based on the discussion in rejection (F) above.

Thus, it is respectfully submitted that each of the independent claims 15, 18, 30 and 31 stands in condition for allowance as well as all other pending claims based on their dependency.

* * * *

Applicants respectfully submit that this Amendment and the above remarks obviate the outstanding rejections in this case, thereby placing the application in condition for immediate allowance. Allowance of this application is earnestly solicited.

Please charge any additional fees which may be necessary with respect to this

filing to the Deposit Account of the undersigned, Deposit Account No. 02-4300, and credit any overpayment to said Deposit Account.

Respectfully submitted,
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